CLAIMS

1. A method for transmitting ultrasonic beams into a region in a medical diagnostic imaging system, said method comprising the following steps:

(a) transmitting respective sets of transmit beams along respective scan directions across at least a portion of a frame;

(b) cycling a selected transmit parameter T through a sequence $T_1 \ldots T_n; T_1 \ldots T_n; T_1 \ldots T_n$ across said at least a portion of the frame, where T_1, T_n designate alternative values of the transmit parameter T, and where $n \geq 2$.

2. The method of Claim 1 wherein each set of transmit beams includes only one respective transmit beam.

3. The method of Claim 1 wherein each set of transmit beams includes only two respective beams.

4. The method of Claim 1 wherein each set of transmit beams includes more than one transmit beam.

5. The method of Claim 1 wherein the transmit parameter T comprises transmit waveform phase.

6. The method of Claim 1 wherein the transmit parameter T comprises transmit focus.

7. The method of Claim 1 wherein the transmit parameter T comprises transmit frequency.

8. The method of Claim 1 wherein the transmit parameter T comprises transmit aperture.

9. The method of Claim 1 wherein the transmit parameter comprises transmit waveform.

10. The method of Claim 1 wherein the transmit parameter T comprises transmit phase modulation code.

11. The method of Claims 1 or 10 wherein the transmit parameter T comprises transmit amplitude modulation code.

12. The method of Claim 1 wherein the transmit parameter T comprises transmit waveform complex phase angle.

13. The method of Claim 1 wherein the transmit parameter T comprises fractional harmonic seed amplitude.

14. The method of Claim 3 wherein the transmit parameter T comprises pulse inversion polarity sequence, wherein T_1 corresponds to a pulse inversion polarity sequence (+ -), wherein T_2 corresponds to a pulse inversion polarity sequence (- +), and wherein $n = 2$.

15. The method of Claim 4 wherein the transmit parameter T comprises pulse inversion polarity sequence.

16. The method of Claim 15 wherein T_1 and T_2 correspond to respective pulse inversion polarity sequences that begin with opposite polarity.

17. The method of Claim 1 wherein the transmit parameter T comprises transmit gain.

18. The method of Claim 1 wherein the transmit parameter comprises a parameter selected from the group consisting of: transmit waveform, transmit waveform phase, transmit focus, transmit frequency, transmit aperture, transmit phase modulation code, transmit complex phase angle, transmit gain, pulse inversion polarity sequence, and combinations thereof.

19. The method of Claim 1 wherein the transmit parameter comprises at least two separately variable transmit parameters.

20. The method of Claim 1 wherein all of the transmit beams of step (a) are configured for a single ultrasound imaging mode.

21. The method of Claim 20 wherein all of the transmit beams of step (a) are B-mode transmit beams.

22. The method of Claim 20 wherein all of the transmit beams of step (a) are Doppler-mode transmit beams.

23. A medical ultrasonic imaging system transmitter comprising:

means for forming respective sets of transmit beams along respective scan directions across at least a portion of a frame;

means for cycling a selected transmit parameter T through a sequence $T_1 \ldots T_n$; $T_1 \ldots T_n$; $T_1 \ldots T_n$ across said at least a portion of the frame, where T_1, T_n designate alternative values of the transmit parameter T, and where $n \geq 2$.

24. The invention of Claim 23 wherein each set of transmit beams includes only one respective transmit beam.

25. The invention of Claim 23 wherein each set of transmit beams includes only two respective beams.

26. The invention of Claim 23 wherein each set of transmit beams includes more than one transmit beam.

27. The invention of Claim 23 wherein the transmit parameter T comprises transmit waveform phase.

28. The invention of Claim 23 wherein the transmit parameter T comprises transmit focus.

29. The invention of Claim 23 wherein the transmit parameter T comprises transmit frequency.

30. The invention of Claim 23 wherein the transmit parameter T comprises transmit aperture.

31. The invention of Claim 23 wherein the transmit parameter T comprises transmit waveform.

32. The invention of Claim 23 wherein the transmit parameter T comprises transmit phase modulation code.

33. The invention of Claims 23 or 32 wherein the transmit parameter T comprises transmit amplitude modulation code.

34. The invention of Claim 23 wherein the transmit parameter T comprises transmit waveform complex phase angle.

35. The invention of Claim 23 wherein the transmit parameter T comprises fractional harmonic seed amplitude.

36. The invention of Claim 25 wherein the transmit parameter T comprises pulse inversion polarity sequence, wherein T_1 corresponds to a pulse inversion polarity sequence (+ -), wherein T_2 corresponds to a pulse inversion polarity sequence (- +), and wherein $n = 2$.

37. The invention of Claim 26 wherein the transmit parameter T comprises pulse inversion polarity sequence.

38. The invention of Claim 37 wherein T_1 and T_2 correspond to respective pulse inversion polarity sequences that begin with opposite polarity.

39. The invention of Claim 23 wherein the transmit parameter T comprises transmit gain.

40. The invention of Claim 23 wherein the transmit parameter comprises a parameter selected from the group consisting of: transmit waveform, transmit waveform phase, transmit focus, transmit frequency,

transmit aperture, transmit phase modulation code, transmit complex phase angle, transmit gain, pulse inversion polarity sequence, and combinations thereof.

41. The invention of Claim 23 wherein the transmit parameter comprises at least two separately variable transmit parameters.

42. The invention of Claim 23 wherein all of the transmit beams of step (a) are configured for a single ultrasound imaging mode.

43. The invention of Claim 42 wherein all of the transmit beams of step (a) are B-mode transmit beams.

44. The invention of Claim 43 wherein all of the transmit beams of step (a) are Doppler-mode transmit beams.

45. A medical diagnostic ultrasound imaging method comprising the following steps:

(a) transmitting a plurality of transmit beams into a region, said transmit beams comprising at least a first and second type of transmit beams that differ in transmit phase;

(b) receiving a plurality of receive beams in response to the transmit beams from the region;

(c) coherently combining at least two of the receive beams, the combined receive beams associated with at least one transmit beam of the first type and at least one transmit beam of the second type; and

(d) spatially filtering the combined receive beams prior to detection.

46. A medical diagnostic ultrasound imaging method comprising the following steps:

(a) transmitting a plurality of spatially distinct ultrasonic transmit beams into a region;

(b) receiving a plurality of receive beams from the region, each receive beam associated with a respective one of the transmit beams; said transmit beams and said associated receive beams comprising at least first and second types of beams which differ in at least one scan parameter other than transmit and receive beam steering direction and beam origin;

(c) combining at least two of the receive beams associated with spatially distinct ones of the transmit beams, said combined receive beams associated with at least one beam of the first type and at least one beam of the second type.

47. The method of Claim 46 wherein the at least one scan parameter comprises transmit phase.

48. The method of Claim 47 wherein step (c) comprises the step of

(c1) coherently combining said at least two of the receive beams prior to detection to enhance a harmonic component thereof; and

(c2) coherently combining said at least two of the receive beams prior to detection to enhance a fundamental component thereof.

49. The method of Claim 46 wherein the at least one scan parameter comprises a plurality of scan parameters.

50. The method of Claim 46 wherein the at least one scan parameter comprises aperture.

51. The method of Claim 50 wherein step (b) comprises the step of varying receive aperture between a first receive aperture comprising even transducer elements for the first type of beams and a second receive aperture comprising odd transducer elements for the second type of beams.

52. The method of Claim 46 wherein the at least one scan parameter comprises system frequency.

53. The method of Claim 46 wherein the at least one scan parameter comprises receive spectral response.

54. The method of Claim 46 wherein the at least one scan parameter comprises receive center frequency.

55. The method of Claim 46 wherein the at least one scan parameter comprises receive spectral bandwidth.

56. The method of Claim 46 wherein the at least one scan parameter comprises transmit focus.

57. The method of Claim 46 wherein the at least one scan parameter comprises transmit waveform.

58. The method of Claim 46 wherein the at least one scan parameter comprises transmit waveform complex phase angle.

59. The method of Claim 46 wherein the at least one scan parameter comprises transmit code.

60. The method of Claim 46 wherein the at least one scan parameter comprises pulse inversion polarity sequence.

61. The method of Claims 46, 47, 56 or 57 wherein the transmit beams transmitted in step (a) alternate between the first and second types of beams across the region.

62. The method of Claims 46, 50, 52 or 53 wherein the receive beams received in step (b) alternate between the first and second type of beams across the region.

63. The method of Claims 46 wherein a single respective one of the receive beams is received in step (b) in response to each of the transmit beams.

64. The method of Claim 46 wherein at least two respective ones of the receive beams are received in step (b) in response to each of the transmit beams.

65. The method of Claim 46 wherein the first and second types of beams comprise transmit beams that differ in at least one scan parameter other than transmit beam steering direction and beam origin.

66. The method of Claim 46 wherein the first and second types of beams comprise receive beams that differ in at least one scan parameter other than receive beam steering direction and beam origin.

67. The method of Claim 46 wherein step (a) comprises the step of transmitting multiple simultaneous transmit beams into the region.

68. The method of Claim 46 wherein step (a) comprises the step of transmitting the transmit beams over multiple azimuthal coordinates and multiple elevational coordinates.

69. The method of Claim 46 further comprising the step of:

(d) forming an M-mode image from at least some of the combined receive beams.

70. The method of Claim 46 further comprising the step of:

(d) spatially filtering the combined receive beams prior to detection.

71. The method of Claim 70 wherein step (d) comprises the step of spatially filtering the combined receive beams in azimuth prior to detection.

72. The method of Claim 70 wherein step (d) comprises the step of spatially filtering the combined receive beams in elevation prior to detection.

73. The method of Claim 70 wherein step (d) comprises the step of applying the combined receive beams to a spatial filter prior to detection, said spatial filter selected from the group consisting of:

a separable azimuth filter, a separable elevation filter, a non-separable range-azimuth filter, a non-separable range-elevation filter, a non-

separable azimuth-elevation filter, a non-separable range-azimuth-elevation filter, and combinations thereof.

74. The method of Claim 73 wherein the spatial filter comprises constant filter coefficients, said filter coefficients selected from the group consisting of real and complex filter coefficients.

75. The method of Claim 73 wherein the spatial filter comprises variable filter coefficients that vary as a function of at least one of range, azimuth and elevation.

76. The method of Claim 70 further comprising the step of:

(e) coherently combining at least two of the receive beams associated with a common one of the transmit beams; and

wherein step (d) comprises the step of spatially filtering the combined receive beams of both steps (c) and (e) prior to detection.

77. The method of Claim 46 further comprising the step of combining at least two of the receive beams associated with a common one of the transmit beams.

78. The method of Claim 46 wherein step (c) comprises the step of coherently combining said at least two of the receive beams prior to detection.

79. The method of Claim 46 wherein step (c) comprises the step of compounding said at least two of the receive beams subsequent to detection.

80. A medical diagnostic ultrasound imaging system comprising:

means for transmitting a plurality of spatially distinct ultrasonic transmit beams into a region;

means for receiving a plurality of receive beams from the region, each receive beam associated with a respective one of the transmit beams; said transmit beams and said associated receive beams comprising at least first and second types of beams which differ in at least one scan parameter other than transmit and receive beam steering direction and beam origin;

means for combining at least two of the receive beams associated with spatially distinct ones of the transmit beams, said combined receive beams associated with at least one beam of the first type and at least one beam of the second type.

81. The invention of Claim 80 wherein the at least one scan parameter comprises transmit phase.

82. The invention of Claim 80 wherein the at least one scan parameter comprises aperture.

83. The invention of Claim 80 wherein the receiving means comprises means for varying receive aperture between a first receive aperture comprising even transducer elements for the first type of beams and a second receive aperture comprising odd transducer elements for the second type of beams.

84. The invention of Claim 80 wherein the at least one scan parameter comprises system frequency.

85. The invention of Claim 80 wherein the at least one scan parameter comprises receive spectral response.

86. The invention of Claim 80 wherein the at least one scan parameter comprises transmit focus.

87. The invention of Claim 80 wherein the at least one scan parameter comprises transmit waveform.

88. The invention of Claim 80 wherein the at least one scan parameter comprises transmit waveform complex phase angle.

89. The invention of Claim 80 wherein the at least one scan parameter comprises transmit code.

90. The invention of Claim 80 wherein the at least one scan parameter comprises pulse inversion polarity sequence.

91. The invention of Claims 80, 81, 86 or 87 wherein the transmitting means alternates the transmit beams between the first and second types of beams across the region.

92. The invention of Claims 80, 82, 84 or 85 wherein the receiving means alternates the receive beams between the first and second types of beams across the region.

93. The invention of Claim 80 wherein the receiving means receives a single respective one of the receive beams in response to each of the transmit beams.

94. The invention of Claim 80 wherein the receiving means receives at least two respective ones of the receive beams in response to each of the transmit beams.

95. The invention of Claim 80 wherein the first and second types of beams comprise transmit beams that differ in at least one scan parameter other than transmit beam steering direction and beam origin.

96. The method of Claim 80 wherein the first and second types of beams comprise receive beams that differ in at least one scan parameter other than receive beam steering direction and beam origin.

97. The invention of Claim 80 wherein the transmitting means comprises a multiple simultaneous beam transmitter.

98. The invention of Claim 80 wherein the transmitting means comprises means for transmitting the transmit beams arranged in a pattern that extends over multiple azimuthal coordinates and multiple elevational coordinates.

99. The invention of Claim 80 further comprising:

means for processing at least some of the combined receive beams to form an M-mode image.

100. The invention of Claims 80 or 90 further comprising:

means for spatially filtering the combined receive beams prior to detection.

101. The invention of Claim 100 wherein the filtering means comprises an azimuth filter.

102. The invention of Claim 100 wherein the filtering means comprises an elevation filter.

103. The invention of Claim 100 wherein the filtering means comprises a spatial filter selected from the group consisting of:

a separable azimuthal filter, a separable elevation filter, a non-separable range-azimuth filter, a non-separable range-elevation filter, a non-separable azimuth-elevation filter, and a non-separable and range-azimuth elevation filter, and combinations thereof.

104. The invention of Claim 103 wherein the spatial filter comprises constant filter coefficients selected from the group consisting of real and complex filter coefficients.

105. The invention of Claim 103 wherein the spatial filter comprises variable filter coefficients that vary as a function of at least one of range, azimuth and elevation.

106. The invention of Claim 100 further comprising:

second means for combining at least two of the receive beams associated with a common one of the transmit beams, and wherein the filtering means comprises means for spatially filtering the combined receive beams of both the first-mentioned combining means and the second combining means prior to detection.

107. The invention of Claim 80 further comprising means for combining at least two of the receive beams associated with a common one of the transmit beams.

108. The invention of Claim 80 wherein the combining means comprises means for combining said at least two of the receive beams prior to detection.

109. The invention of Claim 80 wherein the combining means comprises means for compounding said at least two of the receive beams subsequent to detection.

110. An ultrasonic imaging method comprising the following steps:

(a) transmitting a set of ultrasonic transmit beams into a region, at least some of the transmit beams focused at spatially distinct directions, said transmit beams each comprising a respective fundamental transmit component, the fundamental transmit components associated with selected ones of the transmit beams characterized by a phase difference;

(b) receiving a plurality of ultrasonic receive beams from the region, each receive beam associated with a respective one of the transmit beams, and each receive beam comprising a respective fundamental receive component and a respective harmonic receive component;

(c) summing at least two of the receive beams associated with spatially distinct ones of the transmit beams to form a composite signal, said phase difference of step (a) selected to cause the fundamental receive components to destructively interfere to a greater extent than the harmonic receive components in the summing step.

111. The method of Claim 110 wherein the transmit beams traverse the region.

112. The method of Claim 110 wherein each of the receive beams is spatially aligned with the respective associated transmit beam.

113. The method of Claim 110 wherein at least some of the receive beams are spatially offset from the respective associated transmit beams.

114. The method of Claim 113 wherein step (b) comprises the step of receiving a respective plurality of the receive beams in association with each transmit beam.

115. The method of Claims 110 or 114 wherein the receive beams summed in step (c) are spatially aligned.

116. The method of Claim 110 wherein the receive beams summed in step (c) are spatially distinct.

117. The method of Claim 110 wherein step (b) comprises the step of receiving two of the receive beams in association with each of the transmit beams, and wherein the receive beams summed in step (c) are spatially aligned.

118. The method of Claim 110 wherein the phase difference approaches 180°.

119. The method of Claim 110 further comprising the step of introducing a non-linear contrast agent into the region prior to step (a).

120. The method of Claim 110 wherein steps (a)-(c) are performed during a medical diagnostic examination session, and further comprising the step of maintaining the region free of added non-linear contrast agent during the entire medical diagnostic examination session.

121. The method of Claim 110 wherein step (c) comprises the step of coherently summing said at least two of the receive beams to form the composite signal.

122. The method of Claim 110 wherein the transmit beams are spaced at a selected range to provide Nyquist sampling.

123. The method of Claim 110 wherein the transmit beams are spaced at a selected range by a separation S_B greater than a separation S_N required for Nyquist sampling.

124. The method of Claim 110 wherein the transmit beams are spaced at a selected range by a separation S_B less than a separation S_N required for Nyquist sampling, and wherein S_B/S_N is no less than ½.

125. The method of Claim 110 wherein the transmit beams are spaced at a selected range by a separation S_B less than a separation S_N required for Nyquist sampling, and wherein S_B/S_N is less than ½.

126. The method of Claims 122, 123, 124 or 125 wherein the transmit beams are characterized by a transmit focal range and wherein the selected range is at the transmit focal range.

127. The method of Claims 122, 123, 124 or 125 wherein the transmit beams are characterized by a transmit focal range, and wherein the selected range is spaced from the transmit focal range.

128. The method of Claim 110 wherein step (a) comprises the step of inverting a phase of the fundamental transmit components for alternate ones of the transmit beams such that the phase difference is about equal to 180°.

129. In an ultrasonic imaging system comprising:

a transducer array;

a transmit beamformer coupled to the transducer array and operative to transmit a set of ultrasonic transmit beams into a region, said transmit beams focused at spatially distinct directions, said transmit beams each comprising a respective fundamental transmit component;

a controller coupled to the transmit beamformer and operative to cause the fundamental transmit components associated with selected ones of the transmit beams to differ from one another by a selected phase difference;

a receive beamformer coupled to the transducer array and operative to receive a plurality of receive beams from the region, each receive beam associated with a respective one of the transmit beams, and each receive beam comprising a respective fundamental receive component and a respective harmonic receive component;

a summer operative to sum at least two of the receive beams associated with spatially distinct ones of the transmit beams to form a composite signal, said phase difference effective to cause the fundamental receive components to destructively interfere to a greater extent than the harmonic receive components in the composite signal.

130. The method of Claim 129 wherein the transmit beams traverse the region.

131. The method of Claim 129 wherein each of the receive beams is spatially aligned with the respective associated transmit beam.

132. The method of Claim 129 wherein at least some of the receive beams are spatially offset from the respective associated transmit beams.

133. The method of Claim 129 wherein the receive beamformer is operative to receive a respective plurality of the receive beams in association with each transmit beam.

134. The invention of Claims 129 or 133 wherein the receive beams summed in the summer are spatially aligned.

135. The invention of Claim 129 wherein the receive beams summed in the summer are spatially distinct.

136. The invention of Claim 129 wherein the phase difference approaches 180°.

137. The invention of Claim 129 wherein the summer is operative to coherently sum said at least two of the receive beams to form the composite signal.

138. The method of Claim 129 wherein the transmit beams are spaced at a selected range to provide Nyquist sampling.

139. The method of Claim 129 wherein the transmit beams are spaced at a selected range by a separation S_B greater than a separation S_N required for Nyquist sampling.

140. The method of Claim 129 wherein the transmit beams are spaced at a selected range by a separation S_B less than a separation S_N required for Nyquist sampling, and wherein S_B/S_N is no less than ½.

141. The method of Claim 129 wherein the transmit beams are spaced at a selected range are spaced by a separation S_B less than a separation S_N required for Nyquist sampling, and wherein S_B/S_N is less than ½.

142. The method of Claims 138, 139, 140 or 141 wherein the transmit beams are characterized by a transmit focal range, and wherein the selected range is at the transmit focal range.

143. The method of Claims 138, 139, 140 or 141 wherein the transmit beams are characterized by a transmit focal range, and wherein the selected range is spaced from the transmit focal range.

144. The invention of Claim 129 wherein the transmit beamformer comprises an inverter, responsive to the controller, operative to invert a phase of the fundamental transmit components for alternate ones of the transmit beams such that the phase difference is about equal to 180°.

145. An ultrasonic imaging method comprising the following steps:

(a) transmitting a set of ultrasonic transmit beams into a region, said transmit beams each comprising a respective fundamental transmit component, the fundamental transmit components associated with selected ones of the transmit beams characterized by a phase difference;

(b) receiving a plurality of ultrasonic receive beams from the region, at least two of the receive beams associated with each respective one of the transmit beams, each receive beam comprising a respective fundamental receive component and a respective harmonic receive component;

(c) summing at least two of the receive beams to form a composite signal, said phase difference effective to cause the fundamental receive components to destructively interfere to a greater extent than the harmonic receive components in the summing step.

146. The method of Claim 145 wherein the receive beams summed in step (c) are spatially aligned.

147. The method of Claim 145 wherein at least some of the receive beams summed in step (c) are spatially distinct.

148. The method of Claims 145 or 146 wherein the transmit beams associated with the receive beams summed in step (c) are spatially aligned.

149. The method of Claims 145 or 146 wherein the transmit beams associated with the receive beams summed in step (c) are spatially distinct.

150. An ultrasonic imaging system comprising:

a transducer array;

a transmit beamformer coupled to the transducer array and operative to transmit a set of ultrasonic transmit beams into a region, said transmit beams each comprising a respective fundamental transmit component;

a controller coupled to the transmit beamformer and operative to cause the fundamental transmit components associated with selected ones of the transmit beams to differ from one another by a selected phase difference;

a receive beamformer coupled to the transducer array and operative to receive a plurality of receive beams from the region in response to each respective one of the transmit beams, each receive beam comprising a respective fundamental receive component and a respective harmonic receive component;

a summer operative to sum at least two of the receive beams to form a composite signal, said phase difference effective to cause the fundamental receive components to destructively interfere to a greater extent than the harmonic receive components in the composite signal.

151. The invention of Claim 150 wherein the receive beamformer is operative to receive the receive beams summed by the summer as spatially aligned receive beams.

152. The invention of Claim 150 wherein the receive beamformer is operative to receive at least some of the receive beams summed by the summer as spatially distinct receive beams.

153. The invention of Claims 150 or 151 wherein the transmit beamformer is operative to transmit the transmit beams associated with the receive beams summed by the summer as spatially aligned transmit beams.

154. The invention of Claims 150 or 151 wherein the transmit beamformer is operative to transmit the transmit beams associated with the receive beams summed by the summer as spatially distinct transmit beams.

155. An ultrasonic imaging method comprising the following steps:

(a) transmitting a set of ultrasonic transmit beams into a region, said transmit beams each comprising a respective fundamental transmit component, the fundamental transmit components associated with selected ones of the transmit beams characterized by a phase difference;

(b) receiving a plurality of ultrasonic receive beams from the region, each receive beam associated with a respective one of the transmit beams, and each receive beam comprising a respective fundamental receive component and a respective harmonic receive component;

(c) summing at least two spatially distinct ones of the receive beams to form a composite signal, said phase difference effective to cause the fundamental receive components to destructively interfere to a greater extent than the harmonic receive components in the summing step.

156. The method of Claim 155 wherein three of the receive beams are summed in step (c).

157. The method of Claim 155 wherein four of the receive beams are summed in step (c).

158. An ultrasonic imaging system comprising:

a transducer array;

a transmit beamformer coupled to the transducer array and operative to transmit a set of ultrasonic transmit beams into a region, said transmit beams each comprising a respective fundamental transmit component;

a controller coupled to the transmit beamformer and operative to cause the fundamental transmit components associated with selected ones of the transmit beams to differ from one another by a selected phase difference;

a receive beamformer coupled to the transducer array and operative to receive a plurality of receive beams from the region in response to the transmit beams, each receive beam comprising a respective fundamental receive component and a respective harmonic receive component;

a summer operative to sum at least two spatially distinct ones of the receive beams to form a composite signal, said phase difference effective to cause the fundamental receive components to destructively interfere to a greater extent than the harmonic receive components in the composite signal.

159. The invention of Claim 158 wherein the summer is operative to sum three of the receive beams.

160. The invention of Claim 158 wherein the summer is operative to sum four of the receive beams.

161. An ultrasonic imaging method comprising the following steps:

(a) transmitting a set of ultrasonic transmit beams into a region, said transmit beams each comprising a respective fundamental transmit component, the fundamental transmit components associated with selected ones of the transmit beams characterized by a phase difference;

(b) receiving a plurality of ultrasonic receive beams from the region, each receive beam associated with a respective one of the transmit beams, and each receive beam comprising a respective fundamental receive component and a respective harmonic receive component;

(c) summing at least three of the receive beams using at least two different summing weights to form a composite signal, said phase difference effective to cause the fundamental receive components to destructively interfere to a greater extent than the harmonic receive components in the summing step.

162. An ultrasonic imaging system comprising:

a transducer array;

a transmit beamformer coupled to the transducer array and operative to transmit a set of ultrasonic transmit beams into a region, said transmit beams each comprising a respective fundamental transmit component;

a controller coupled to the transmit beamformer and operative to cause the fundamental transmit components associated with selected ones of the transmit beams to differ from one another by a selected phase difference;

a receive beamformer coupled to the transducer array and operative to receive a plurality of receive beams from the region in response to the transmit beams, each receive beam comprising a respective

fundamental receive component and a respective harmonic receive component;

a summer operative to sum at least three of the receive beams using at least two different summing weights to form a composite signal, said phase difference effective to cause the fundamental receive components to destructively interfere to a greater extent than the harmonic receive components in the composite signal.

163. An ultrasonic imaging method comprising the following steps:

(a) transmitting a set of ultrasonic transmit beams into a region, said transmit beams each comprising a respective fundamental transmit component, the fundamental transmit components associated with selected ones of the transmit beams characterized by a phase difference;

(b) receiving a plurality of ultrasonic receive beams from the region, each receive beam associated with a respective one of the transmit beams, and each receive beam comprising a respective fundamental receive component and a respective harmonic receive component;

(c) summing an odd number of the receive beams to form a composite signal, said phase difference effective to cause the fundamental receive components to destructively interfere to a greater extent than the harmonic receive components in the summing step.

164. The method of Claim 163 wherein the odd number is three.

165. An ultrasonic imaging system comprising:

a transducer array;

a transmit beamformer coupled to the transducer array and operative to transmit a set of ultrasonic transmit beams into a region, said transmit beams each comprising a respective fundamental transmit component;

a controller coupled to the transmit beamformer and operative to cause the fundamental transmit components associated with selected ones of the transmit beams to differ from one another by a selected phase difference;

a receive beamformer coupled to the transducer array and operative to receive a plurality of receive beams from the region in response to the transmit beams, each receive beam comprising a respective fundamental receive component and a respective harmonic receive component;

a summer operative to sum an odd number of receive beams to form a composite signal, said phase difference effective to cause the fundamental receive components to destructively interfere to a greater extent than the harmonic receive components in the composite signal.

166. The invention of Claim 165 wherein the odd number is three.